

**Claude system.** A process for the production of liquid air in which the compressed gas is made to perform work in an expansion engine and thus cool itself.

**Clausius-Mosotti law.** A relation between density and dielectric constant of dielectrics.

**clay.** A hydrated aluminum silicate. Generalized formula  $Al_2O_3 \cdot SiO_2 \cdot xH_2O$ . Component of soils in varying percentages.

**Properties:** Fine, irregularly shaped crystals ranging from 150 microns to less than 1 micron (colloidal); reddish-brown to pale buff color, depending on iron oxide content; odorless. D approximately 2.50. Insoluble in water and organic solvents. Absorbs water to form a plastic, moldable mass and in some cases a thixotropic gel (bentonite). Refractory material; strong ion-exchange capability; important in soil chemistry and construction engineering.

**Derivation:** Weathering of rocks.

**Occurrence:** Southeastern U.S., Wyoming, Texas, Canada, England, France, the former USSR.

**Available forms:** Kaolinite, montmorillonite, attapulgite, illite, bentonite, halloysite.

**Grade:** Natural, refined, air floated.

**Hazard:** Dusts may irritate to nose and throat. Suspensions of dust are a fire hazard.

**Use:** Ceramic products, refractories, colloidal suspensions, oil-well drilling fluids, filler for rubber and plastic products, films, paper coating, decolorizing oils, temporary molds, filtration, carrier in insecticidal sprays, catalyst support.

**See fuller's earth; bentonite; ceramic; refractory; kaolin; slip clay; polyorganosilicate graft polymer.**

**cleave.** (1) Of a crystal, to break or separate along definite planes defined by the crystalline structure. It may cleave in one direction, as in mica, or in several. (2) Of an alkene molecule, to divide into two compounds (aldehydes or ketones) at the double bond. This is usually done by ozone, followed by hydrolysis in the presence of powdered zinc.

**Cleland's reagent.** See dithiothreitol.

**Clemmensen reaction.** The Clemmensen method of reduction (1913) consists in refluxing a ketone with amalgamated zinc and hydrochloric acid. Acetophenone, for example, is reduced to ethylbenzene. The method is applicable to the reduction of most aromatic-aliphatic ketones to at least some aliphatic and alicyclic ketones, to the  $\gamma$ -keto acids obtainable by Friedel-Crafts condensations with succinic anhydride (succinolylation), and to the cyclic ketones formed by intramolecular condensation.

**Cleveland Open Cup.** See COC.

**Cleve's acid.** (1-naphthylamine-6-sulfonic acid).

**Properties:** Colorless needles. Mp  $>330^\circ C$ . Slightly soluble in water.

**Derivation:** Nitration of naphthalene- $\beta$ -sulfonic acid. On reduction with iron, this yields a mixture of 1-naphthylamine-6-sulfonic acid (Cleve's acid) and 1-naphthylamine-7-sulfonic acid (or Cleve's acid-1,7). The latter is separated by crystallization as the sodium salt; the 1,6-acid precipitates on acidification.

**Use:** Azo dye intermediate.

**Cleve's acid-1,7.** (1-naphthylamine-7-sulfonic acid).

**See Cleve's acid.**

**cliffstone Paris white.** A special grade of whitening made from a hard grade of English chalk.

**clinical chemistry.** A subdivision of chemistry that deals with the behavior and composition of all types of body fluids, including the blood, urine, perspiration, glandular secretions, etc. It involves analysis and testing of these for content of numerous metabolic constituents, as well as foreign materials; thus it also includes toxicological factors.

**clinoptilolite.** A natural, inorganic zeolite used as a selective ion-exchange medium for removal of ammonia from plant wastewater.

**clomiphene.** See 1-chloro-2-(4-diethylaminoethoxyphenyl)-1,2-diphenylethylene.

**clopidol.** (3,5-dichloro-2,6-dimethyl-4-pyridinol; Cloyd).

**CAS:** 2971-90-6.  $C_8H_8Cl_2NO$ . A penta-substituted pyridine derivative.

**Properties:** A solid. Mw 192.06, mp  $>320^\circ C$ . Insoluble in water.

**Hazard:** Toxic. TLV: 10 mg/m<sup>3</sup>.

**cloud point.** In petroleum technology, the temperature at which a waxy solid material appears as a diesel fuel is cooled. This material is harmful to engine performance.

**cloud seeding.** See nucleation.

**clove oil.** (caryophyllus oil). An essential oil distilled from cloves. Optically active.

**Use:** Medicine (local), flavoring, dentistry, perfumery, confectionery, soaps.

**clupanodonic acid.**  $C_{21}H_{34}COOH$ .

**Derived from herring oil.**

**clupeine.** A protamine (simple protein) from herring. Contains no sulfur.

**Properties:** Watery soluble.

**cluster catalysis.** See catalysis.

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